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Neonatal Encephalopathy- A Retrospective Analysis in a Tertiary Care Centre of Southern Assam

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ABSTRACT
In the current study the aim was a retrospective analysis of the etiology, immediate outcome and the effect of therapeutic intervention in neonatal encephalopathy.A retrospective study of neonates admitted in NICU of Silchar Medical college & hospital with complaints of encephalopathy during September 2022 to September 2023.It was a hospital based retrospective study with sample size of 939.Most common etiology of encephalopathy in this series was birth asphyxia(54.8%) followed by meningitis (20.2%) and metabolic abnormalities(14.4%) in which hypoglycemia was the most frequent cause. Males outnumbered females in the present study. Meningitis was the most common cause of neonatal encephalopathy in preterm infants. Therapeutic hypothermia had beneficial effect on reducing the morbidity as it reduces the severity of encephalopathy in neonates.

I. INTRODUCTION

Neonatal encephalopathy (NE) is a clinical syndrome encompassing a wide variety of characteristics of the newborn with alteration of consciousness being the key feature along with other features like level of abnormal tone and reflexes,seizures, difficulty to initiate or maintain respiration [1,2] and is associated with multi organ dysfunction [3]. Because neonatal encephalopathy is estimated to affect 2 to 6 per 1,000 term births, of which HIE accounts for approximately 1.5 per 1,000 term births [4].NE is a clinical terminology that does not entail specific etiology in its definition however, a wide variety of causes are presumed to be responsible for it that includes hypoxic ischemic encephalopathy (HIE), perinatal infections, placental abnormalities, metabolic disorders, coagulopathies and neonatal vascular stroke . Eventhough in more than half of the cases, the causes of NE remains elusive [5].

II. MATERIALS AND METHODS

A retrospective study of neonates admitted in NICU of Silchar medical college & hospital with complaints of encephalopathy during September 2022 to September 2023.It was a hospital based retrospective studywith sample size of 939.Newborns included in the study were less than or equal to 28 days with features suggesting neonatal encephalopathy having APGAR score <3 at 5min, continued resuscitation at 10minutes after birth, refusal to feed, lethargic or irritability,history of or active abnormal body movement while newborns with congenital anomalies and critically ill children were excluded from the study.The aim was a retrospective analysis of the etiology, immediate outcome and the effect of therapeutic intervention in neonatal encephalopathy.

III. RESULTS

In the current study 38.4% newborns were females while 61.6% were males. It was found that pre- term delivery occurred in (23.5%) neonates while remaining (76.5%) were term gestation.57.7% of the admitted babies with neonatal encephalopathy had birth asphyxia, 19.9% had meningitis ,15.1% had metabolic disturbances,4.3% had hyperbilirubinemia,3% had other miscellenous causes. As far as the association of period of gesatation with the etiology of 71.9% of the term babies with neonatal encephalopathy had birth asphyxia ,3.9% of the term babies with neonatal encephalopathy had meningitis,14.9% had metabolic disturbances or alterations, while 5.4 % term newborns with hyperbilirubinemia was presumed to be causing neonatal encephalopathy.11.4% of preterm babies with encephalopathy was accounted due to birth asphyxia, meningitis accounted for 72.3% of preterm babies with encephalopathy,15.9% had metabolic disturbances while 0.4% had hyperbilirubinemia as the cause of neonatal encephalopathy.The clinically diagnosed cases showed that most common etiology of neonatal encephalopathy was birth asphyxia followed by Meningitis. Other etiologies includedmetabolic disturbances, hyperbilirubinemia, structural malformations and others. Among the metabolic disturbances majority hadhypoglycaemia.

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Therapeutic hypothermia initiated within 6hours of life. In the current study out of 60 babies who received therapeutic hypothermia 11 babies (18.3%) had no convulsions, 32 babies (53.3%) had one episode of convulsions, eight babies (13.3%) had two episodes of convulsions, six babies (10%) had three to four episodes of convulsions,while three babies (5%) had more than four episodes of convulsions. Out of 60 babies receiving therapeutic hypothermia ,58(96.67%) were discharged.

Table 1 showing distribution of term and preterm neonates included in the study as well as gender distribution.

	Inborn		Outborn	
Male	223	60.2%	356	62.6%
Female	213	38.8%	147	37.4%
Term	283	76.4%	436	76.8%
Preterm	87	23.6%	133	23.2%
Total	370		569	

Table 2 showing distribution of study population based on etiology of encephalopathy in inborn babies.

	Inborn babies	Percentage
Birth asphyxia	232	62.1%
Meningitis	72	19.4%
Metabolic disturbances	60	16.2%
Hyperbilirubinemia	0	0
Others	8	2.1%
	370	

Table 3 showing distribution of study population based onetiology of encephalopathy in outbornbabies.

	Outborn babies	Percentage
Birth asphyxia	312	54.8%
Meningitis	115	20.2%
Metabolic disturbances	82	14.4%
Hyperbilirubinemia	40	7.2%
Others	20	3.5%
	569	

Table 4 showing distribution of different causes of neonatal encephalopathy leading to mortality in the study population**.**

	Inborn		Outborn	
HIE 3	9/34	26.4%	31/94	33%
HIE 2	12/199	6.5%	36/218	16.5%
Meningitis	2/72	2.7%	6/115	5.2%
Hyperbilirubinemia			2/40	5%
Metabolic disturbances	1/60	1.7%	2/82	2.43%

Table 5 showing number of babies undergoing therapeutic hypothermia with distribution of different frequency of convulsion episodes.

Number of convulsion episode	Number	Percentage
Nil	11	18.33%
1 episode	32	53.34%
2 episodes	8	13.33%
3 to 4episodes	6	10%
More than 4	3	5%

IV. DISCUSSION

In the current study of neonatal encephalopathy there was a male preponderance of 60.2% while female constituted 39.2 % of the neonatal encephalopathy cases which is similar to studies by Moayedi et al.[6] where males constituted 58.2 %, Eghbalian F, Monsef A et al [7]where males comprised of 73.5% and Parvin R et al [8]constituted 76.5% male babies with neonatal encephalopathy.The present study had 77 % term

babies which is similar to the studies by Parvin et al.[8] and Marzoki JMA et al.[9] where 80.4% and 88.6% babies were male. In the current study birth asphyxia(54.8%) was the most common cause accounting for the neonatal encephalopathy followed by meningitis (20.2%), metabolic disturbances (14.4%),bilirubin encephalopathy (7.5%) and other causes (3.1%).This study was similar to Parvin R et al.[8] where perinatal asphyxia accounted for majority of neonatal encephalopathy (56.86%), followed by septicemia(15.67%),meningitis (11.76%) ,kernicterus (3.92%),neurometabolic disorder (3.92%) and other causes (7.87%). Similar to the current study, study conducted by Digra SK et al.[10] also had birth asphyxia(67.5%) as the most common cause of neonatal encephalopathy followed by infections (septicemia and meningitis).In the current study,meningitis was the most common cause in preterm infants which was in concordance to studies conducted by to Parvin R et al.[8] and Kumar A et al.[11]where the observed a significant association between meningitis and metabolic abnormalities and preterm gestation. In the present study, therapeutic hypothermia has reduced the episode of convulsion and had better outcome which was similarto the studies Mary Rutherford,Luca A Ramenghiet al.[12]which showed that therapeutic hypothermia decreased brain tissue injury in infants with hypoxic ischaemic encephalopathy with less gray – white matter abnormalities with better MRI scans.

V. CONCLUSION

Most common etiology of encephalopathy in this series was birth asphyxia followed by meningitis and metabolic abnormalities in which hypoglycemia was the most frequent cause. Males outnumbered females in the presentstudy. Meningitis was the most common cause of neonatal encephalopathy in preterm infants. Therapeutic hypothermia had beneficial effect on reducing the morbidity as it reduces the severity of encephalopathy in neonates.

REFERENCES

[1]. Executive summary: Neonatal encephalopathy and neurologic outcome, second edition. Report of the American College of Obstetricians and Gynecologists' Task Force on Neonatal Encephalopathy. ObstetGynaecol 2014;123:896–901.

[2]. Volpe JJ. Neonatal encephalopathy: an inadequate term for hypoxic-ischemic encephalopathy. Ann Neurol. (2012) 72:156–66. 10.1002/ana.23647 [DOI] [PubMed] [Google Scholar]

[3]. Shah P, Rip Hagen S, Beyene J, Perlman M. Multiorgan dysfunction in infants with post-asphyxial hypoxic-ischaemic encephalopathy. Arch Dis Child Fetal Neonatal Ed. (2004) 89:F152–F155. 10.1136/adc.2002.023093 [DOI] [PMC free article] [PubMed] [Google Scholar]

[4]. Russ JB, Simmons R, Glass HC. Neonatal Encephalopathy: Beyond Hypoxic-Ischemic Encephalopathy. Neoreviews. 2021 Mar;22(3):e148-e162. doi: 10.1542/neo.22-3-e148. PMID: 33649088.

[5]. Nelson KB, Bingham P, Edwards EM, Horbar JD, Kenny MJ, Inder T, et al. Antecedents of neonatal encephalopathy in the Vermont Oxford Network Encephalopathy Registry. Pediatrics. (2012) 130:878–86. 10.1542/peds.2012-0714 [DOI] [PMC free article] [PubMed] [Google Scholar]

[6]. Moayedi AR, Zakeri S, Moayedi F. Neonatal seizure: etiology and type. Iran I Child Neurol. 2008;23-26.

[7]. Eghbalian F, Monsef A, Taghdiri MM. Neonatal seizures: etiology and frequency. Iran J Child Neurol. 2008:39-42.

[8]. Parvin R, Salim AF, Rahman M, Chowdhury K, Sultana A, Ahmed S, et al. Neonatal seizures: correlation between clinico-etiological profile and EEG findings. Bangladesh J Child Health. 2014;38(1):19-23.

[9]. Marzoki JMA. Clinico-Biochemical profile of neonatal seizures (Research Thesis). Hilla-Iraq- Babylon: Babylon University: 2009.

[10]. Digra SK, Gupta A. Prevalence of seizures in hospitalized neonates. JK Sci. 2007:9:27-29

[11]. Kumar A, Gupta A, Talukdar B. Clinico-etiological and EEG profile of neonatal seizures. Indian I Pediatr. 2007:74(1):33-7.

[12]. Mary Rutherford, Luca A Ramenghi, A David Edwards, Peter Brocklehurst, Henry Halliday, Malcolm Levene, Brenda Strohm, Mariannet Thoresen, Andrew Whitelaw, Denis Azzopardi